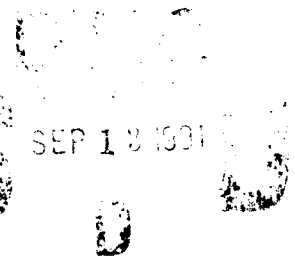
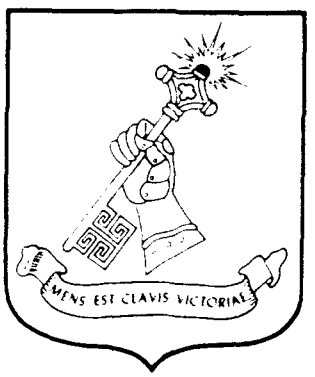


The Challenge of Delivering Firepower at the Operational Level in AirLand Battle-Future

A Monograph
by

Major Thomas W. Weafer
Field Artillery



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ABSTRACT

THE CHALLENGE OF DELIVERING FIREPOWER AT THE OPERATIONAL LEVEL IN AIRLAND BATTLE-FUTURE by Major Thomas W. Weafer, USA, 58 pages.

This monograph discusses some of the challenges which may exist to the delivery of operational level fires on a mid to high intensity AirLand Battle-Future (ALBF) battlefield. The U.S. Army's ALBF concept depends heavily on fires at the operational level to not only be the major battlefield killer, but also to shape the battlefield and establish the conditions for decisive maneuver. The ALBF concept relies upon a system of emerging technologies to provide real-time and "near perfect" intelligence from sensors to detect, target, and then quickly destroy enemy forces with smart and brilliant munitions. Given the change in both the capability and the role of fires at the operational level, doctrinal changes will be necessary to support future Airland warfare.

Given the U.S. Army's relative lack of experience with the use of fires at the operational level, this monograph briefly examines both historical and current Soviet thought on the subject. The paper also defines what operational fires are, considers relevant Army and Air Force doctrine, and briefly examines the ALBF concept and its associated emerging technologies. Challenges addressed include the integration of battlefield air interdiction at the corps level, improvement of the interface between the intelligence and the targeting processes, and the adjustments that the fire support system will have to make to function as a separate entity at the operational level. Finally, the monograph offers several conclusions, potential implications, and possible solutions to some of the challenges that lay ahead in the delivery of operational fires on the ALBF battlefield.

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INTRODUCTION

Throughout the history of modern warfare, firepower has been a major component of the combat power equation. Indeed, Napoleon's comment that "Fire is everything, the rest does not matter," underlines the important role that firepower held even on the Napoleonic battlefield.[1] However, the relative importance of firepower versus maneuver has waxed and waned over time depending upon the relative technological advances in mobility, protection and firepower.[2]

While our nation has a history of supporting maneuver at the expense of firepower during times of peace, trends are emerging which suggest that a more balanced view of fires and maneuver is appropriate.[3] Recent technological developments in the areas of command and control, weapons and munitions, and target acquisition have combined to the point where "the potential power of modern artillery is probably the greatest change on the modern battlefield."[4] As the range, accuracy, lethality and responsiveness of both air and ground delivered indirect firepower increases, both movement and concentration of forces on the battlefield will become increasingly difficult. As a result, firepower may move from a supporting role to become a more decisive element of combat power.[5]

Operation Desert Storm has provided us with an excellent example of the decisive edge that high technology firepower may afford us. New and emerging technologies have enabled the operational commander to employ air, land and sea delivered firepower with

unprecedented and devastating effect. The impact of this operational level firepower not only isolated the Kuwaiti Theater of Operations (KTO) but also disrupted and destroyed the Iraqi forces within Kuwait. Thus, through the application of operational firepower, the commander was able to establish the conditions necessary for the rapid and decisive maneuver of the coalition forces.

The phasing of operational fires followed by decisive operational maneuver seen in Desert Storm is remarkably similar to the sequencing of operational fire and maneuver in the Army's evolving AirLand Battle-Future (ALBF) concept. ALBF emphasizes the use of advanced sensors and intelligence systems to first detect and target enemy formations. The operational commander then establishes the conditions for decisive maneuver by delaying, disrupting and destroying the enemy with long range artillery, attack helicopters and fixed wing aviation.

Implicit in the task of delivering long range fires is the requirement to rapidly fuse sensor intelligence into targeting data and then pass that data to the appropriate fires delivery system. Providing such fires also requires the integration of indirect fires, army aviation, nonlethal fires, obstacles and air force assets to quickly and efficiently produce high impact operational level effects on the battlefield.

Clearly, the requirement to orchestrate fires at the corps level in ALBF is well beyond the scope of current fire support doctrine and organization. Because he lacks control of sufficient long range assets, today's corps artillery commander, acting as the corps fire support

coordinator (FSCOORD), is primarily an allocator of army and air force fire support assets that operate at the tactical level of war. Indeed, the fact that there is no standing targeting cell in the current corps headquarters structure is evidence of the relatively small scope that the current fire support system has at the operational level of war.[6]

The significant challenge of integrating numerous new technologies to achieve the operational impact with fires that the ALBF concept requires implies a possible redefinition of the way in which operational level fires are provided. This monograph will therefore seek to explore some of the key challenges which exist to the delivery of operational fires on the ALBF battlefield.

In considering the issues that may challenge the use of fires in ALBF, it is useful to look at current doctrine for doctrinal tenets or criteria to focus the examination of the subject. As the Army's capstone warfighting manual, FM 100-5, Operations, says that two of the most important considerations in integrating fire support into operations are **adequacy** and **flexibility.**[7] Similarly, JCS Pub 3-09, Doctrine for Joint Fire Support Operations, stresses that unity of effort and mission focus are fundamental to the successful application of joint fires.[8] For the purposes of this paper, unity of effort and mission focus will be considered as a single criterion called **unity of purpose.**

Adequate fires are timely, effective and are continually available. Adequate fires are also of sufficient lethality to achieve the desired impact. **Flexibility** in fires is achieved when the commander has the

ability to react to changing situations and likely contingencies by maneuvering fires to influence the final outcome. Such flexibility in a fires system allows the commander to both quickly shift the priorities of the entire fires system and to also select from a range of delivery systems the best means to accomplish the mission. Finally, **unity of purpose** is measured by the degree to which all corps fires assets are integrated and focussed to achieve specified operational impact on the battlefield in support of the commander's operational concept. This paper will examine current doctrine, the extensive Soviet thought about the operational use of fires, and the ALBF concept using the above criteria as tools for analysis in attempting to anticipate challenges to the effective delivery of operational fires on the future battlefield.

OPERATIONAL FIRES

Army doctrine defines operational art as the use of military forces to attain strategic ends in a theater of war through the design, organization and conduct of campaigns and major operations.[3] While, at its "upper end," operational art is primarily concerned with defining military objectives to fulfill strategic ends, at its "lower end," it addresses the way campaigns and major operations are designed and pursued.[4] At the operational level of war, commanders are concerned with where and when to fight and with bringing the enemy to battle under the best terms possible.[5] Additionally, because of the integrated nature of modern warfare, the operational perspective is almost always a joint one.

Although current doctrine does not align a particular size unit with the operational level of war, it does say that the corps is the central point on the air-land battlefield where joint "combat power is synchronized to achieve tactical and operational advantage over the enemy."[12] Combat power is defined as the effect created by combining maneuver, firepower, protection and leadership "into actual capability through violent and coordinated action concentrated at the decisive time and place."[13] As a portion of the combat power equation, it is firepower that "provides the destructive force essential to defeating the enemy's ability and will to fight."[14]

Although neither FM 100-5 nor FM 6-20, Fire Support in the AirLand Battle, define specifically what operational firepower is, FM 100-5 does acknowledge that current weapons can generate firepower that is devastatingly effective in greater depth and accuracy than ever before.[15] Recognizing this fact, newer documents such as FM 100-6, Large Unit Operations (Draft), and TRADOC Pamphlet 11-9, Blueprint of the Battlefield, use the term "operational fires" and provide detailed descriptions of what they are. These two manuals note that:

-- Fires are operational when they are applied to achieve a decisive impact on the conduct of a campaign or major operation.

-- Such fires are planned and synchronized at the operational level and are by nature joint activities.

-- Operational fire and maneuver are coequal and must be integrated into the operational scheme.

-- Operational fires include the processing of targets whose attack will have a major impact on a campaign or major operation.

-- Currently, such fires are provided largely by theater air forces. However, the increasing range, accuracy and lethality of surface delivery systems promises greater use of such systems at the operational level in the future.[7]

In short, the term operational fires refers to the application of fires to achieve a major impact on the conduct of a campaign or major operation. Planned, targeted and synchronized at the operational level, they are usually joint in nature and are integrated with manuever into the operational scheme. It is also important to note that operational fires are different from fire support. Operational fires are a separate component of the operational scheme and are coequal with operational maneuver. Because operational fires have long been almost the exclusive province of the air force, army doctrine has only recently begun to address them.

CURRENT U.S. ARMY FIRE SUPPORT DOCTRINE

Field Manual 100-5 states that "The principle fire support element in fire and maneuver is the field artillery."[8] It goes on to say that the field artillery not only provides cannon, rocket and missile fires, "but it also integrates all means of fire support available to the commander."[9] This means that the field artillery commander has the doctrinal responsibility for the integration of not only field artillery fires but those of naval gunfire, tactical air, mortars and army aviation as well.

Field Manual 6-20, as the capstone manual for fire support, provides the doctrinal guidance which defines the fire support system and the fundamental roles and

principles which guide the employment of the field artillery. It notes that fire support is the product of a system of systems consisting of three distinct components: command, control and communications (C3) systems to direct the effective attack of targets, target acquisition and surveillance systems necessary to acquire targets, and weapons systems and munitions to deliver firepower onto targets.[3]

Doctrine also notes that three principles must guide the command direction of the fire support system. First, the fire support system must operate as one force with a unity of purpose. Second, the system must be responsive to the overall force commander. And third, doctrine reinforces the fact that the direction of the fire support system is the responsibility of the field artillery commander.[4]

With respect to field artillery, FM 6-20 describes both its support relationships and its fire support roles. The assignment of one of four standard tactical missions establishes the relationship of a field artillery unit to a supported maneuver unit or to another field artillery unit. Of the four possible missions, direct support (DS) and reinforcing are the more responsive, decentralized missions, while general support reinforcing (GSR) and general support (GS) are more centralized and are less responsive to maneuver units. While these four support relationships allow the commander to allocate resources in order to strike a balance between responsiveness and centralization, it is important to note that they are <u>support</u> relationships which tend to focus the field

artillery commander on a supporting role.

Doctrine also describes the three fire support roles of the field artillery: close support, counterfire and interdiction. While close support is generally the domain of division and corps artillery DS and reinforcing cannon units, counterfire and interdiction are normally fired by GS and GSR units. However, because of both a preoccupation with the overwhelming Soviet artillery threat and the fact that only the LANCE missile system has had a range much in excess of 30 kilometers, U.S. artillerymen at both the division and the corps level have generally been concerned more with the execution of tactical level close support and counterfire as opposed to long range interdiction fires.

In addition to discussing the support relationships and roles of the field artillery, current doctrine also describes its capabilities and limitations. While doctrine says that the field artillery is capable of providing a variety of fires in any type of terrain or weather, it cautions that it has several limitations. It notes that because field artillery is an area weapon, its use to destroy point targets usually requires large amounts of ammunition and is not considered economical. For this and other reasons, field artillery has a limited ability to destroy armored, moving targets. Also of importance is the fact that field artillery has a limited self-defense capability against ground and air attack."

Although FM 6-20 recognizes that AirLand Battle doctrine "reestablishes a requirement to increase the scope of fire support to an operational level that has not existed since the Second World War," it provides little

guidance on how fires are to function at the operational level.[22] Acknowledging this fact, the current commandant of the Field Artillery School, Major General Raphael J. Hallada, has written that while "We must provide fire support at the tactical and operational levels," we will have to refine our doctrine before this can occur.[23]

The fact that U.S. Army doctrine describes all use of fires as fire support is indicative of the bias towards tactical fire support that currently exists. There is little recognition in current doctrine of the ability of fires to function as a separate entity on the battlefield. It is fair to say that the fire support community is just now beginning to emerge from its tactical shell as the result of the increased range, accuracy and lethality of the new fire support systems available to it. In contrast, the U.S. Air Force, with the inherent speed, range and flexibility of its assets, has long had an operational perspective on warfare.

U.S. AIR FORCE DOCTRINE

Many of the basic principles governing the application of air power have not changed since World War II. The 1943 publication of FM 100-20, Command and Employment of Air Power, established for the first time the concept that air power and land power are coequal and interdependent forces.[24] In so doing, FM 100-20 codified battle-proven doctrine that allowed for the concentration of air power in time and space in support of operational objectives.[25] In fact, the current Air Force Manual 1-1, Basic Aerospace Doctrine of the United States Air Force, echoes this

perspective when it states that air power "can be the decisive force in warfare."[26]

FM 100-20 also institutionalized the priorities of theater air support as first, gaining air superiority (now called counter air), second, conducting air interdiction (AI), and third, providing close air support (CAS).[27] From an operational perspective, the Air Force views these three interrelated air operations as part of a distinct air campaign.[28]

Although CAS, by virtue of its nature, requires detailed coordination with ground forces, the Air Force retains a large degree of control over air interdiction. The aim of air interdiction is to delay, disrupt, divert and destroy an enemy's military capability before it can be applied against friendly forces. Air Force doctrine notes that while air interdiction may be an independent effort, it is normally coordinated with the land force commander.[29]

A subset of air interdiction is battlefield air interdiction (BAI). BAI is that part of air interdiction which attacks enemy targets in position to have a near term effect on friendly land forces. Because the land commander has a greater interest in BAI targets, BAI currently requires joint coordination at the component level. However, once BAI is planned, it is controlled and executed by the air commander as part of the overall air interdiction effort.[30]

The 1982 promulgation of the Army's AirLand Battle doctrine spawned the 1984 joint service agreement on the Joint Attack of the Second Echelon (J-SAK). J-SAK was a

milestone in that it was among the first documents concerning how the Army and Air Force would jointly conduct modern warfare.[31] This is significant because since World War II, the Army and Air Force have become separate services with separate paths and interests.[32]

J-SAK was designed to coordinate the activities of the Army and Air Force at the operational level in attempting to affect the momentum of the enemy's second echelon towards the FLOT. It established that the land and air commanders are coequals who should consult and coordinate with each other. It allowed that the land commander should prioritize BAI targets while the air commander prioritizes AI targets and makes the final selection of all AI (and BAI) targets. It also gave the Army the ability to submit mission-oriented requests for BAI. (For example: "Delay the 7th Guards Tank Division west of the Weser River for six hours.")[33]

But while the J-SAK goes a long way towards enhancing our ability to conduct airland warfare, it still lacks sufficient "jointness." For instance, the J-SAK says that from the air perspective, close combat (CAS) and general support (AI and BAI) are provided in support of the land force battle. But while CAS is jointly planned and its execution controlled by the Air Support Operations Center (ASOC) collocated with the corps, BAI nominations are prioritized and forwarded to the Air Force Tactical Air Control Center (TACC) through its Army liaison element, the Battlefield Control Element (BCE).

However, at the component level joint planning does not occur. The J-SAK procedures specifically note that the

TACC should simply exchange information with the BCE to accomplish the necessary joint coordination for operations.[34] At the same time, it is the air component commander's TACC which makes the final decision on what AI and BAI targets to attack. Thus, not only is the ground commander not able to designate targets (he can only nominate and prioritize), but those targets that he does recommend may be rejected not as the result of joint planning but for any number of reasons that the air component commander may offer.[35] The bottom line of the J-SAK procedures is that air interdiction planning and execution is not a joint responsibility. Instead, the J-SAK calls for "coordination and consultation" at the component level and makes no provision for the joint planning of fires at the corps level.[36] This arrangement is sure to be strained in the future as the corps gains a greater capability to project its organic fires to operational depths.

In contrast to the U.S. system, Soviet air-ground cooperation is perhaps an ideal model of "jointness." Because of their rich history of military thought on the operational application of firepower, we look next to the Soviets for insights on the use of operational fires.

SOVIET EMPLOYMENT OF OPERATIONAL LEVEL FIRES

While U.S. theorists, influenced by the World War II divorce of the Army and the Air Force, think almost exclusively in terms of the strategic and tactical aspects of aviation and missiles, the Soviets have long recognized the operational aspects of all types of long range

fires.[37] During the interwar years, Soviet theorists such as Mikhail Tuchachevskiy and Vladimir Triandifillov laid down a foundation of operational thought which was to give firepower a dominant role on the battlefield. As a founding father of Soviet military thought, Triandifillov saw in the lessons of World War I the need to double the size of the artillery relative to the infantry in order to provide the overwhelming firepower necessary to punch gaps in modern defenses.[38]

For his part, Tuchachevskiy felt that the massive application of firepower could enable the simultaneous attack and destruction of an enemy throughout the depth of his defense.[39] His vision of the future included the use of long range guns and missiles designed to disrupt enemy C2 and pin down enemy reserves so that enemy echelons could be individually destroyed in detail.[40] A similar view was espoused in 1925 by General Gonen who argued that artillery was more important than ever to preserve one's freedom of maneuver while denying the same freedom to the enemy. He believed that long range fires in conjunction with aircraft and chemical attacks could deliver a "fire blow" to disrupt and destroy enemy infantry and artillery.[41]

By World War II, the Soviets had accepted the firepower of artillery as a decisive factor in war. Indeed, the "artillery offensive" was to become the hallmark of Soviet major operations.[42] By the 1945 Vistula-Oder offensive, the Soviets were task organizing massive groupings of artillery at front and army level to excise by fire specific elements of the enemy force. Combining painstaking target reconnaissance with

concentrations of up to 200 guns per kilometer, Soviet artillery worked in concert with air attacks to launch numerous "fire blows" to not only open huge gaps in the enemy line but also to achieve "fire superiority" by destroying the enemy indirect fire capability.[43]

Current Soviet doctrine reflects the lessons of the Great Patriotic War. While western armies generally believe that firepower supports the scheme of maneuver, the Soviets believe that the purpose of maneuver is to exploit the effects of firepower.[44] While they believe that firepower is the dominant force on the battlefield of today and tomorrow, the Soviets feel that new and emerging technologies will bring fundamental changes to the future of warfare.[45]

Today the Soviet General Staff believes that we are in the midst of a "revolution in military affairs" based on the increased capability of precision delivery weapons.[46] The Soviet concepts of future war, which in the past have been quite accurate, include dynamic, high tempo, high intensity air-land operations on large, nonlinear battlefields.[47] With regard to the future potential of fires, Marshall Ogarkov believes that:

> highly accurate, terminally guided weapons systems,unmanned aircraft and...new electronic control systems...make it possible to increase sharply (by at least an order of magnitude) the destructive power of conventional weapons, bringing them closer to weapons of mass destruction in terms of effectiveness.[48]

Indeed, Soviet writers have begun to use the term "firestrike" to denote the operational level application of artillery, rocket and air delivered precision weapons "to

destroy a specific objective or enemy formation, using entirely conventional means."[49] It is interesting to note that until recently, the Soviets have used the term "strike" only in reference to nuclear blows. Its use in regard to conventional fires clearly indicates the Soviet intention to substitute such fires for nuclear ones.[50]

Unlike his U.S. counterpart, the Soviet operational level commander does not have to coordinate fires with a coequal air commander. In the Soviet view, air and ground fires are both subordinate to the dictates of the operational level ground commander. Their concept of "integrated fire destruction of the enemy" emphasizes unity of purpose and close coordination between the artillery and air delivered firepower in order to make the most efficient use of each arm.[51] Soviet air power in ground support is viewed largely as longer range firepower and Soviet attack helicopters serve as a branch of the artillery.[52]

The interworking of artillery and air is a crucial issue since the Soviets believe that up to 50 percent of the firepower on the modern battlefield will be delivered by air.[53] However, while air delivered weapons have unquestionably become more important, the Soviets continue to rely on their artillery as a primary means of fire in an effort to eliminate uncertainty from their combat power equations.[54] They see artillery as the most reliable and responsive fires means and as the least susceptible to bad weather and countermeasures.[55]

Soviet fear of enemy precision guided munitions and standoff acquisition and attack give their concept of "fire superiority" new importance. Given their operational

perspective on the use of fires, the Soviets view overall air and ground fire superiority much the way we view air superiority.[56] They define fire superiority as a firepower advantage over the enemy in a given battle or operation. Such an advantage allows one to execute his own fires while suppressing those of the enemy. The Soviets believe that fire superiority will be attained by the side that achieves surprise and opens fire first with highly accurate and effective massed fires.[57]

Probably the most important recent development in Soviet fires doctrine is the introduction of the reconnaissance-strike (operational) and reconnaissance-fire (tactical) complexes. Designed around dedicated target acquisition assets, precision weapons, and automated C3, these complexes are believed to be the most effective way of employing precision guided munitions. These organizations are very decentralized and have streamlined communication channels which enable them to engage targets in real or near-real time.[58]

At the operational level, the reconnaissance-strike complex (RSC) will employ rocket and missile artillery as well as tactical aircraft, attack helicopters and electronic warfare means to target similar enemy deep strike systems.[59] The increased responsiveness of the RSC is designed to enable it to shoot first in the battle for fire superiority.

If, as the Soviets and many other theorists believe, modern technology is heralding a quantum leap in the effectiveness and importance of firepower on the future battlefield, the Soviets will be well served by their

institutional reliance on the operational effects of firepower. Before moving on, it is important to recap some of the high points of our brief look at the Soviets. First, because the Soviets have traditionally been able to mass huge amounts of artillery, they view it as "the main fire strength of the ground forces, and not merely a `supporting arm'."[60] While western armies discuss the "fire support community," the Soviets talk about the "integrated fire destruction of the enemy" in reference to the unified mission of artillery and air to ensure the freedom of maneuver of ground forces.[61]

Second, the Soviets believe that emerging technologies will vastly increase the range, accuracy and lethality of future fires. For this reason, they believe that in the future it will be more important than ever to achieve both air and ground fire superiority by achieving surprise and by shooting first. Third, because of the destructive power of future conventional weapons, the Soviets believe that they can be used in mass to simulate the operational effects of nuclear weapons. They use the term "firestrike" to describe the operational use of such weapons to destroy specific objectives or enemy formations.

Finally, the Soviets believe that the most efficient way to employ these new technologies is to package them in a streamlined grouping known as the reconnaissance-strike complex. Such groupings capitalize on simplicity and advanced C3I to accomplish operational fires tasks in real or near-real time.

Although the Soviets seem to be fading as a military threat due to their domestic economic problems, their

legacy of thought on the use of fires at the operational level has been both substantial and quite visionary. We might be well served to keep it in mind as we attempt to chart a new course for the use of fires at the operational level in AirLand Battle-Future.

THE CHALLENGE OF AIRLAND BATTLE-FUTURE

Just as the Soviets see future warfare as being characterized by nonlinear conditions and dominated by highly lethal weapons, the ALBF concept recognizes similar trends. While current AirLand Battle doctrine envisions linear warfare that could become nonlinear, ALBF sees a battlefield five to fifteen years in the future on which forces are initially employed in nonlinear operations.[62] The ALBF concept assumes that a combination of economic pressures, the high cost of modern weapons, and arms control negotiations will cause further reductions in the size of armed forces.[63]

With fewer forces available, battlefield density will decrease and conditions will become increasingly nonlinear at the operational level.[64] Large gaps will exist when units concentrate and operations will be characterized by rapid and fluid maneuver which will be used to exploit highly lethal fires. Additionally, the nonlinear battlefield will place a premium on the offensive and the primary emphasis will be on the destruction of the enemy force versus the occupation of terrain.[65]

The ALBF concept asserts that "the most important trend of the next decade is the extension of chip and software technology into sensors, companion long range

lethal precision weapons and command and control systems."[66] Since such technology is increasingly available on the worldwide market, it is important for the U.S. to maintain its technological superiority in this area. Doing so will allow U.S. forces to leverage their technological edge to gain the advantage in nonlinear operations.[67]

The two prerequisites for the success of these operations are first, the ability to know continually where enemy forces are, and second, the capability to destroy those forces at long range.[68] Advanced air, ground and space based sensors will enable the commander to better "see the battlefield." Such sensors, when combined with the verification of physical reconnaissance, will allow the commander to know the location of significant (battalion size or larger) enemy forces almost all of the time.[69] Accurate long range ground to ground systems will then allow the operational commander to destroy and disrupt the enemy with organic assets at operational depths previously reachable only with BAI sorties.[70]

The level at which joint acquisition and fires systems will be integrated is the corps, the centerpiece of the ALBF concept. Rather than army groups and armies designing campaigns and major operations, the ALBF corps will have the greater role at the operational level.[71] As an operational commander, the corps commander will choose where and when to fight in order to establish the conditions most favorable to his force. He will also arrange his battlefield activities in time, space and purpose in order to mass his forces at the decisive time

and place to destroy the combat potential of the enemy.[72]

The ALBF concept envisions a corps operation in a zone 600 kilometers deep by 300-400 kilometers wide that progresses in four overlapping phases.[73] In Stage I, the DETECTION/PREPARATION phase, reconnaissance, intelligence, surveillance and target acquisition (RISTA) assets from national to tactical level are integrated to form a picture of the enemy disposition, capabilities, and intent.[74] From this picture, the commander decides on how to structure and fight the battle and begins to position forces in preparation to engage the enemy with fires. The immediate task of the air component during this phase is to attempt to gain air superiority.[75]

In Stage II, ESTABLISH CONDITIONS FOR DECISIVE MANEUVER (from hereon referred to as the FIRES phase), a continuing RISTA effort is combined with all long range artillery, attack helicopter and air force BAI assets to destroy specified enemy forces in order to shape and condition the battlefield. The objective of this phase is to attack enemy centers of gravity to disrupt his plan, to separate enemy formations in time and/or space, and to attrite them so that they are vulnerable to decisive maneuver. Under ideal conditions, the fires of this phase may alone be decisive, allowing the commander to refocus his combat power for use elsewhere.[76]

The DECISIVE OPERATIONS phase focuses on culminating the effort of the previous two stages with decisive operational and tactical fire and maneuver. In this stage the corps commander commits combined arms brigades under the tactical control of a division headquarters at a time

and place of his choosing so that enemy formations will be highly vulnerable to defeat. Divisional and corps reinforcing fires provide close support to maneuver units while corps long range fires assets continue to maintain favorable conditions for maneuver. Timing during this phase is critical, for delay of ground maneuver could cause the loss of the favorable conditions established by fires."[7]

In the final phase, RECONSTITUTION, logistics resources are surged directly from corps logistics units directly to the maneuver brigades as part of a pre-coordinated operation. The focus is on anticipating the necessary sustainment actions to prepare the force as quickly as possible after combat for follow-on operations."[8]

Based upon this brief summary of the ALBF concept, it is obvious that fires will play a major role in the conduct of operations. As the ALBF Umbrella Concept states, "As the principle ingredient for disrupting and destroying the enemy's momentum, indirect fire provides the lens for focusing the application of combat power."[9] Indeed, in ALBF, both shaping the battlefield and setting the conditions for decisive maneuver become new, but important, tasks for fires at the corps level. How then, will we integrate and deliver fires of unprecedented range, accuracy and lethality to achieve the operational effects that the ALBF concept requires?

ENHANCED CAPABILITIES FROM EMERGING TECHNOLOGY

As noted earlier, current doctrine describes the fire support system as a system of systems comprised of three components: weapons and munitions, target acquisition and surveillance, and C3. Significant technological improvements in all of these areas will combine to give the future operational commander powerful firepower tools with which to shape tomorrow's battlefield. Indeed, theorist Richard Simpkin believes that

> We are now at one of the peaks of theoretical speculation which presage radical change... the dominance of indirect fire achieved by surveillance and fire control on one hand, and by terminal guidance on the other.[30]

Perhaps the most significant change within this triad will be the quantum leap in the range, accuracy and lethality of indirect fire munitions. Chris Bellamy argues that artillery delivered anti-armor systems of the 1990's may be the most revolutionary change in warfare since the helicopter.[31] In particular, a new family of munitions for the Multiple Launch Rocket System (MLRS) will give the corps commander organic assets with significantly increased range and lethality. These new weapons will eventually include both a Sense and Destroy Armor (SADARM) and a terminally guided warhead capability.[32] Employing dual infrared and millimeter wave seeking technology, these munitions will be able to search for and "top attack" moving armored vehicles at ranges from 30 kilometers (MLRS) to well over 100 kilometers (ATACMS).[33]

The centerpiece of the second part of the fires triad will be the Joint Surveillance Target Attack Radar System (JSTARS). Meant to do for the ground battle what AWACS does for the battle in the air, JSTARS will be capable of providing both fixed and moving target imagery over an area 480 kilometers wide by 320 kilometers deep.[34] JSTARS will report real time targeting information to key army C2 nodes through Ground Station Modules (GSM). The GSM will also link other advanced systems such as the Guardrail Common Sensor, Quicklook and the long range Unmanned Aerial Vehicle (UAV) to the ground commander.

These advanced delivery and acquisition means will only be as effective as the C2 system that ties them together. While the current TACFIRE system performs only 10 of the Army's 27 recognized fire support functions, the Advanced Field Artillery Tactical Data System (AFATDS) will perform all of them.[35] Based on a distributed processor network, it will coordinate all forms of fires to include field artillery, tactical air, army aviation, naval gunfire and electronic warfare. Joint air operations will also be facilitated the Automated Target Handoff System which will be carried on F-16 and AH-64 aircraft. This system will pass real time target attack information directly from AFATDS to airborne attack means.[36] AFATDS will also be very flexible in that it will not only provide assistance in fire support decision making but it will also allow rapid net reconfiguration to create "quickfire" channels directly between sensors and delivery systems.[37]

ACHIEVING UNITY OF PURPOSE

However, even with all of these technological improvements, the commander will still face significant challenges in trying to orchestrate adequate and flexible operational level fires with sufficient unity of purpose to efficiently support his operational concept. JCS Publication 3.09, Doctrine for Joint Fire Support Operations, stresses that command and support relationships must facilitate unity of effort and contribute to the accomplishment of the commander's objectives.[88] However, as Lieutenant General (ret.) John H. Cushman has noted, current U.S. joint airland warfare doctrine lacks sufficient integration and detail at the operational level to do this.[89] He calls for an approach, like that of the Soviets, which is integrated and functional and "emphasizes unity of purpose and unity of command."[90] Only by achieving this unity of purpose will the operational commander be able to achieve a U.S. version of the "integrated fire destruction of the enemy."

The delivery of operational level fires becomes more "joint" every time a new long range army, navy or air force system is fielded. And doctrine must evolve accordingly to recognize the blending of what were previously relatively distinct roles for the different services. General Robert D. Russ, commander of Tactical Air Command, notes that if

> The Army commander, who is generally the overall commander, will be able to see (with JSTARS) interdiction targets that are the Air Force's to

> go after, he will want to say more about attacking them--because those forces are the ones that will be in his backyard tomorrow...The Army is developing some systems that will go back there--ATACMS and others. Therefore our targeting philosophy and how we do the interdiction mission becomes different from what it was in the past.[91]

In the context of ALBF, perhaps nowhere are these potential changes more important than in the joint employment of BAI. Because of its range and flexibility, BAI is, and will remain, a primary means of deep attack.[92] Thus, the ALBF concept places a premium on the close integration of BAI into the corps commander's fires scheme. Yet the Army, through the corps Air Support Operations Center (ASOC), currently only has the authority to decide how, when and where CAS sorties will be used. As we recall from our brief look at the J-SAK, BAI sorties are planned and conducted by the air component as a subset of AI and "theoretically do not need detailed integration with surface units because their targets are beyond the physical location of surface forces."[93] Clearly, on the ALBF battlefield, BAI needs better integration into the overall scheme than the "consultation and coordination" at the air component level which the J-SAK currently prescribes.[94]

Fortunately, doctrine evolving out of the joint Army-Air Force AirLand Forces Application Agency (ALFA) recognizes the need for increased integration of BAI and other air force assets with ground force attack means. ALFA's "Air Attack Action Plan" (AAAP), recently approved by the commanding generals of both Air Force TAC and Army

TRADOC, emphasizes joint targeting, planning and information exchange at the corps level. Consistent with the greater focus on the operational level in ALBF, the plan reallocates some existing Tactical Air Control Party (TACP) assets from heavy maneuver battalions to the corps to provide for a more robust planning function. It also adds a targeting officer to the corps TACP to help integrate air force targeting expertise, acquisition assets and analysis into the development of the high payoff target list.[95]

The AAAP also expands the role of the ASOC to include the final planning and execution of BAI missions and the capability to retarget on-going BAI missions to meet changing battlefield needs.[96] The plan additionally proposes realigning the ASOC away from its parent TACC and basing it permanently with the supported corps headquarters under the command of the corps air liaison officer (ALO). Such a move would not only foster closer joint working relationships but would also make the ASOC more available for joint planning and exercises.[97]

Finally, ALFA's concept stresses a top-down approach that recognizes the importance of the commander's intent in providing a unifying purpose to the integrated employment of all fires assets. And while the corps commander has the overall responsibility for ensuring that all fires assets are synchronized, the importance of the FSCOORD as the doctrinal single point of contact for the coordination of

all fires remains paramount.[98] Yet the singular use of fires to decisively interdict enemy forces is a significant expansion of both the scope and the role of the current corps fire support structure.

Indeed, the planning and delivery of operational level fires in ALBF will require an integration effort on a gargantuan scale.[99] In commenting on this requirement, the director of the Royal United Services Institute for Defence Studies notes that

> ...command and control arrangements should be responsive to such needs. Rather than entering into a dispute between services, or even (branches),...the corps commander should, perhaps, have a combined fire and air support cell with responsibilities extending across the capabilities of artillery, MLRS, helicopters and air support.[100]

In fact, the ALBF concept already plans for such an organization in the form of an expanded corps fire support element (FSE). It is through this organization that the corps artillery commander, as the FSCOORD, will plan, allocate and control all fires assets in support of the corps commander's intent.[101] Thus, this organization will provide a unifying focus for the most efficient use of all fires assets in accordance with the operational concept. But orchestrating the fires fight will require more than just integration. It will mean engaging the right target at the right time with the right resource, and all on a grand scale. It will also require a targeting effort capable of selecting the right targets which, when struck,

will aggregate the high impact operational level effects required.

THE CHALLENGE OF PROVIDING ADEQUATE FIRES

In addition to ensuring unity of purpose, doctrinal evolutions will have to establish new approaches that allow for the delivery of timely and effective fires on the future battlefield. One area which certainly merits a new approach is the relationship of intelligence to targeting at the operational level. Traditionally, the field artillery has depended largely on organic means for target acquisition. With a limited ability to see or shoot deep, the corps FSE did relatively little deep targeting and focused on a fairly close counterfire and interdiction battle. This allowed the intelligence community to concentrate on situation development, and corps deep targets became a byproduct of this process.[102] As a result, targeting information flowing from intelligence sources to fire support agencies has often been too late and therefore inadequate to be of any real attack value.[103]

However, under the ALBF concept, long range fires systems will normally be almost totally dependent upon intelligence sources for targeting information. The success of these systems will be "directly dependent upon the ability of friendly intelligence to provide near-real-time target data" to them.[104] Thus it will be extremely

important for the FSCOORD to articulate his specific targeting requirements to the intelligence and electronic warfare (IEW) community and to coordinate the availability and positioning of IEW assets with them.[105] Additionally, corps IEW managers will have to have a clear understanding of both the commander's intent and the FSCOORD's plan for implementing that intent, for they will now be much more active participants in the target engagement process and in the overall fires battle.

The employment of a disciplined decide-detect-deliver methodology will be of paramount importance to the speed and efficiency of the targeting process. An "up front" decision by the commander on high payoff targeting priorities emphasizes his role in the process and necessarily focusses the scope of future automated systems such as the All Source Analysis System (ASAS) and AFATDS. This commander's guidance will better allow for both automated collection (detect) and rapid assessment (decide). This methodology, combined with reliable communications links to delivery units, will form the heart of a responsive and effective C3I system that will be crucial to the success of the fires battle.[106]

The effectiveness of fires in ALBF will also be measured by the accomplishment of two principle operational fires tasks.[107] The first task will be to negate the enemy's fires assets in order to protect the friendly force. This task could be likened to the Soviet concept of

fire superiority which suppresses both the air and the ground fires threat of the enemy. As previously discussed, achieving fire superiority establishes the initiative and allows freedom of maneuver for friendly forces. After achieving fire superiority, fires assets will then be free to accomplish their second and primary task, to delay, attrite, and destroy enemy forces in order to establish conditions for decisive maneuver.

Its important to recognize that new technology may have doctrinal implications for the traditional roles of the field artillery and for the way in which fire superiority is achieved. As we noted earlier, current doctrine specifies three distinct doctrinal roles for the field artillery: close support, counterfire and interdiction. However, as the Commandant of the Field Artillery School states, "Technological advances have overcome the need for a separate role of counterfire."[29] As a result, field artillery roles will be redefined in ALBF as close support and long-range fires, and both of these roles will include the maintenance of fire superiority through counterfire as part of their mission.[29]

Given the lethality of future munitions, the side that fires first in ALBF should have a significant advantage in the fight for fire superiority. If this is true, then the counterfire fight will largely become a battle of reconnaissance and targeting. The side that conducts the

best RISTA should be able to gain fire superiority as long as it can deliver munitions to the counterfire targets. If both close support and long range fires assets are to conduct counterfire, they will both have to possess or have access to sufficient RISTA resources to quickly locate and target the enemy fires means.

The primary mechanism for accomplishing the tasks of long range fires is described by yet another operational term borrowed from the Soviets, the "firestrike." Like its Soviet counterpart, the ALBF firestrike will be a detailed plan of fires directed against one or more target sets in the threat array.[...] Typically lasting for several hours, the firestrike will require the careful integration of targeting sensors with all types of long range air and ground delivery systems. Also key to the adequacy of an effective firestrike will be the ability to quickly determine battle damage assessment (BDA). For without timely BDA, it will be difficult to determine whether the effects sought by fires have been achieved.[...] Providing long range UAV support to fires delivery units would be one means of ensuring the adequacy of fires through timely BDA.

A new organization called the corps fire control element (FCE) will have the challenge of orchestrating the effective execution of the firestrike. While the FSE at the corps main plans and integrates the use of fires assets in a larger sense, the FCE will be responsible for task organizing sensors, shooters, electronic warfare, and, when

necessary, SEAD assets into firestrike force packages. Probably positioned near the corps TAC, the FCE will probably be a fairly large organization that is capable of being tailored to deal with a specific threat. The FCE should either own or control the assets it organizes and tasks and it should have sufficient C3 assets to enable it to interface with all elements of the fires system.[12]

When field artillery units are positioned well forward on the nonlinear battlefield to take part in firestrikes, the FCE will also have to allocate assets to ensure their survivability. As we noted in our lock at doctrine, field artillery has a limited self-defense capability against ground and air attack. Thus, the FCE may have to coordinate engineer and air defense support for firing elements and may also have to arrange for maneuver units to provide protection for vulnerable rocket and missile units.

Additionally, the FCE will also be heavily involved in ammunition management. Ammunition resupply has traditionally been a limiting factor in the adequacy of field artillery fires. Although current doctrine describes field artillery as an area fire weapon, new precision guided munitions, with their increased lethality, will obviate much of the current need to mass fires. However, with the greater role that fires play in ALBF, both the issue of ammunition expenditure rates and the issue of ammunition resupply on the nonlinear battlefield clearly warrant further study.

When the FCE's span of control becomes too large, it may decide to employ innovative fire coordination measures and mission type orders to ensure the timely and effective delivery of fires. For instance, the FCE could divide up the targeted zone into smaller zones, belts, or "fire boxes" and assign each of these areas to an individual strike asset or to a subordinate strike headquarters (such as a field artillery or army aviation brigade headquarters).[13]

Mission type orders could be given to these elements to achieve a specific effect--to slow, channel, weaken or destroy enemy forces.[14] Such orders would not only have the advantage of placing a premium on initiative at the lowest level, but they would also allow flexibility and the application of expertise at the proper level--an important consideration in joint operations.[15]

In discussing the challenges of operating on a high tempo and fluid ALBF battlefield, TRADOC Commander, General John W. Foss commented that "Simplicity in organizations has a value all its own...Complexity comes apart in combat."[16] The Soviets have recognized the need for simplicity in delivering timely and effective operational level fires with their concept of the reconnaissance strike complex. And at the tactical level, U.S. artillerymen have long recognized the difficulty of engaging moving targets with precision weapons through even the single C2 layer of a battalion TACFIRE system. As a result, they bypass

TACFIRE and establish a simple and responsive link between the observer and the firing battery for the conduct of Copperhead missions."[7]

A current day example of such a grouping at the operational level involving ATACMS and JSTARS was described in a recent Newsweek article entitled "SCUD Killer."

> When U.S. radar planes pick up a SCUD trajectory, the launcher's coordinates are radioed to ATACMS, which can fire a missile at the SCUD site in minutes. ATACMS accuracy is "awesome" says a Defense source."[8]

Just as the Soviets have done, future U.S. doctrine should incorporate the value of simplicity and be flexible enough to quickly structure responsive sensor-shooter links for the engagement of time sensitive targets.

ENSURING THE FLEXIBILITY OF FIRES

At the operational level of war, flexibility in fires means having the ability to react to changing situations by maneuvering fires in time, space and purpose to influence the final decision. As the contribution of fires to the overall operation grows from one of support to one where fires act as a separate entity to condition the battlefield, the corps FSCOORD will have to adopt a frame of mind similar to that of a maneuver commander. As such, he will have to develop a scheme of fires that not only includes a main plan but also includes branches, or variations to the main concept. These branches will allow the FSCOORD to adapt his basic scheme to enemy actions or

to varying conditions in the field while still achieving the end desired.[119]

Advanced C3I systems such as AFATDS, ASAS and JSTARS will greatly enhance the commander's operational flexibility. The combination of these advanced C3I systems with a strong "top-down" approach will allow the fires system to rapidly react to changes in either the commander's plan or in his targeting priorities. And the ability of advanced sensors to "see deep" adds flexibility by eliminating uncertainty about enemy dispositions.

Future C3 systems will also have the added benefit of allowing commanders at each level to have a common picture of the battlefield. This common picture serves to increase flexibility, because with it, subordinate echelons of command are much more capable of understanding changes to the commander's operational concept.[120] For fires, this common picture increases flexibility by facilitating the greater use of mission-type orders and by enabling the commander to rapidly alter and disseminate fire coordination measures to all joint fires agencies and subordinate units.

When either enemy capabilities or uncertainty about his intentions threaten the ability of the friendly force to execute the commander's intent, the operational commander could also consider keeping a fires reserve. Although the creation of such a formation would violate current injunctions against placing field artillery and

tactical air in a reserve role, the use of fires as a singular entity in ALBF would seem to dictate that the maintenance of a fires reserve might indeed be appropriate. Current fire support doctrinal methods of anticipating future operations, such as the assignment of on-order missions or the articulation of priorities, are support oriented, tactical in scope and are focused mainly on delivery systems.[xii] Future methods of reserving fires would have to allocate or put on call a slice of the operational level system of systems, to include weapons, munitions, and sensors, in order to give the commander the flexibility to combine surprise with initiative and attack deep with destructive fires at the point of decision.[xiii]

Although attack helicopters are already employed in reserve in the classic sense, tactical air and field artillery might enjoy a more flexible definition of the reserve role. For example, the commander could direct the FSCOORD to maintain a fires reserve capable of delivering a specific effect by fire within a specified time. Given this guidance, the FSCOORD could task the ALO to have the necessary amount of sorties available to react within the required time constraint. Similar guidance given to field artillery units would drive their positioning, C3 arrangements and ammunition consumption but might not prohibit their use in the remainder of the fires battle.

The commander must also have the flexibility offered by both a range of fires options and depth in C3 and target

acquisition systems. Such factors as weather, range, enemy air defense capabilities or the engagement time window may preclude the use of one or more types of fires. It is for this reason that the Soviets continue to rely on their artillery to eliminate uncertainty from the firepower equation.

For example, in the Persian Gulf War, even allied planes equipped with the latest in all-weather avionics were hampered by heavy cloud cover. As the director of the air campaign noted, "the weather has affected everything we've attempted to do," and put the air campaign at least a week behind schedule.[23] Fortunately for the allies in the gulf, there were no time pressures or other constraints inhibiting air delivered fires from establishment of the conditions necessary for decisive operational maneuver. However, in other circumstances, the commander must have adequate alternative means to deliver fires, especially in the form of more reliable surface-to-surface systems.

Depth in C3I and related target acquisition means also gives the commander greater flexibility in tailoring his assets to support the operational concept. At the operational level, the challenge of maneuvering fires is more than shifting the fire of a delivery system. Instead, it requires refocusing a portion of the entire fires triad of systems. A proliferation of sensor systems, in conjunction with the distributed processing capabilities of systems such as AFATDS, will allow the commander greater

flexibility in creating firestrike packages with which to both shape the battlefield and react to changing situations. Additionally, depth in sensors and C3 assets serves to reduce both span of control requirements and the vulnerability of more centralized fire control nodes to enemy counterfire.

In short, flexibility, when combined with timely and effective fires that are integrated to achieve a unity of purpose, will provide a powerful firepower punch that will be capable of quickly responding to the fluidity of the future battlefield.

CONCLUSIONS AND IMPLICATIONS

It seems clear that current operational level fire support doctrine will require substantial evolution and growth in recognition of the fundamental changes that the ALBF concept and its associated emerging technologies will bring to the battlefield. But just what doctrinal challenges will there be in integrating both the new technological capabilities and the new role of fires at the operational level in ALBF?

Clearly, among the most important challenges is the need for the integration of all operational fires means so that they act as one force in support of the commander's operational concept. While current doctrine places this responsibility on the FSCOORD, it gives him insufficient doctrinal guidance or organizational structure to accomplish this mission at the operational level.

Increased steps toward "jointness," especially with regard to the integration of air force fires, will help to solve this problem. Initiatives such as those found in the ALFA's Air Attack Action Plan will significantly enhance the ability of the FSCOORD to orchestrate the various fires assets of the different services. The addition of a dedicated fires planner to the FSE would also give the FSCOORD a planning capability that he must have in ALBF.

Perhaps some consideration should be given to the creation of a joint fires agency at the corps level in place of the current FSE. Such a proposal by the Army might encourage greater interest and participation on the part of the other services, particularly the Air Force, in support of the land battle. Since a large portion of the fires that would be managed by such an agency would continue to be delivered by the Air Force, it is conceivable that such a corps level organization could be commanded by an Air Force officer.

Another significant challenge involves the forging of closer links between the intelligence community and the targeting process. The timely and accurate intelligence available from advanced sensor systems will be perhaps the greatest combat multiplier on the future battlefield. Therefore, it is critical that more responsive methods be developed to produce targeting information from intelligence data in near-real-time. Some sort of targeting information fusion center will have to be formed

to interface the FSE with the corps tactical operations center support element (CTOCSE) and its intelligence analysts. Additionally, the current "ad-hoc" structure of the corps targeting cell will have to be replaced with a standing targeting element with dedicated representatives from each of the relevant staff agencies.

Operating forward on a nonlinear battlefield over extended distances will certainly present new challenges to corps artillery delivery units. With its limited self-defense capability, field artillery may need to be augmented with threat dependent defensive packages to survive in a nonlinear environment. Such packages could include not only air defense and engineer support but also a security force composed of armor and mechanized infantry. Although the security of field artillery units is a tactical issue, failure to provide that security could result in cumulative losses which might have operational level impact.

Likewise, the perennial problem of artillery ammunition resupply becomes potentially even more relevant with the increased importance of rocket and missile fires in ALBF. Such systems use tremendous tonnages of ammunition. Unless the problems associated with moving such tonnages over great distances on a nonlinear battlefield are solved, ammunition resupply may again assume its traditional role as a limiting factor in the effectiveness of artillery firepower.

Field artillery tactical missions may also have to be redefined in ALBF. As the current roles of close support, counterfire and interdiction evolve into the new roles of close support and long-range fires, new tactical missions may have to be developed to reflect the relatively independent role that long range fires will play on the future battlefield. While the four current standard tactical missions will remain relevant for cannon units and for those rocket units allocated from corps for close support, corps long-range units will be employed as tactical entities much as maneuver units are. Thus, the four standard tactical support missions, as defined by each of their seven inherent responsibilities, may no longer be adequate to characterize the role of long range fires on the future battlefield.

For example, current doctrine says that a field artillery unit in general support is positioned and has its fires planned by the force artillery headquarters. Additionally, a GS unit has as its zone of fire the zone of action of the supported unit (the entire corps zone). However, a corps level long range fires unit in ALBF will probably receive a mission type order and then plan its own fires to accomplish the assigned mission. Because a fire unit may be required to move frequently to avoid counterfire, each GS artillery unit will probably receive its own maneuver type boundaries and will position and move itself as necessary inside of those boundaries. Finally,

each unit's zone of fire will be designated by corps fire coordination measures and will have little if anything to do with the zone of action of any supported maneuver unit. Clearly, the new role of long range fires in ALBF implies a possible redefinition of the field artillery standard tactical missions.

Yet another challenge to the delivery of operational fires in ALBF is the question of developing appropriate fire coordination measures. Current measures, oriented on the zones of supported maneuver units, are generally linear in nature and are not particularly well suited for a fast moving, nonlinear environment. New concepts are clearly called for which would not only take into account new C3 and position location technologies, but which would also allow the greatest amount of flexibility in the future delivery of fires.

Such flexibility could result from the maximum use of permissive fire coordination measures. Instead of placing large, linear zones around maneuver units, future technology could display unit boundaries as something more like a moving amoeba on the battlefield, leaving more of the corps zone open as a free fire area.[24] This would minimize the difficult requirement to clear fires on an extended and nonlinear battlefield.

New restrictive forms of fire coordinating measures might also be used to simplify the future delivery of long range fires. Individual fire units could be assigned zones

of responsibility much as manuever units today are given boundaries. For example, in the Gulf War, air force strike packages were assigned to specific "kill boxes" on the ground in Kuwait and were responsible for the destruction of targets only within that box. Using such a method, the battlefield could be partitioned into boxes, belts or zones, enabling the best integration of available fires assets. Factors such as weapons ranges, required effects, terrain relief, air defense threat, and airspace deconfliction would drive the design of such fire coordination measures.

Finally, the meager doctrinal guidance which now exists for the employment of firepower at the operational level will have to be significantly expanded. The great leap in lethality which precision guided munitions will give to conventional firepower will enable the fire support community to add to its traditional role of fire support a new role of fire destruction. Given these increased capabilities, future doctrine should recognize the abilit. of firepower to act as a single entity at the operational level in establishing the necessary conditions for success.

Soviet operational level concepts such as the firestrike, the reconnaissance-strike complex, integrated fire destruction and fire superiority provide a good start point ror the doctrinal debate which is yet to come over the future employment of operational fires. Doctrine writers in the fire support community, spurred by the

development of the ALBF concept, are just now beginning to struggle with its doctrinal implications for the future.

As the 1933 edition of the German Army *Die Truppenfuehrung* noted,

> Even war undergoes a constant evolution. New arms give ever new forms of combat. To foresee this technical evolution before it occurs, to judge well the influence of these new arms on battle, to employ them before others, is an essential condition for success.[125]

Although technology may produce only one quarter of the potential weapons enhancements that it promises, doctrinal changes necessitated by new capabilities are coming, and we need to start thinking about their impact now. It would indeed be a shame if we fail to "judge well the influence of these new arms on battle" and are ill-prepared to exploit our expanded capabilities on the future battlefield.[126]

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